CONNECTICUT GreenGuide

FALL 2016

CT'S GREEN ROLE MODELS PAVE THE WAY

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HARTFORD BUSINESS JOURNAL

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Leaders and Entrepreneurs

Matt Pilon
Editor

This issue of Connecticut Green Guide is anchored by a special section highlighting the winners of the GreenCircle Awards — an annual awards series organized by the Department of Environmental Protection (DEEP) to highlight business, institutions and individuals who have shown leadership in energy efficiency and reducing their impact on the environment.

This year's winners were honored at a late May ceremony organized by the Hartford Business Journal and Green Guide at Infinity Music Hall in Hartford's Front Street District.

But enough from me about GreenCircle. Let DEEP Commissioner Rob Klee tell you more about the awards in his introduction on **Pg. 9**. A profile of each of the 15 winning projects selected from nearly 60 finalists follows.

On **Pg. 6**, check out the latest about lithium-ion battery entrepreneur Christina Lampe-Onnerud's plans for her new Connecticut startup, Cadenza Innovation.

Lampe-Onnerud founded a successful battery company in Massachusetts over a decade ago. As a reporter at our sister paper, the Worcester Business Journal, I covered some of the company's developments in 2011 and 2012. Lampe-Onnerud is hoping to build another successful company, this time in the Nutmeg State, and she's off to a good start.

Be sure to check out the News Cycle briefs on **Pg. 4** for some quick-hit energy news. On **Pg. 5**, our Smart Business feature details a recent energy-efficient lighting overhaul at the Veterans Health Administration in West Haven.

Finally, our ECOmpany segment on **Pg. 30** features a unique green roof installed by one of the state's hospitals.

If you haven't yet, please subscribe to our free Green Guide email newsletter, which comes out every Thursday, at **hartfordbusiness.com/enews**.

Are you a Connecticut company doing something unique with energy or efficiency? Reach out to me at mpilon@hartfordbusiness.com. Thanks for reading.

COVER IMAGES | LEAF WREATH: BARBALISS, VECTORSTOCK.COM; GREEN WAVE: VALENTY, VECTORSTOCK.COM

News Cycle

ENERGY NEWS IN BRIEF

Gas prices, demand suppress wholesale prices

Relatively low consumer demand and natural-gas prices continued to mute the cost of wholesale electricity in New England's power market in June, according to grid operator ISO New England.

The average wholesale electricity price in June was $21.24 per megawatt hour, the third-lowest since 2003, but up from $19.61 last June.

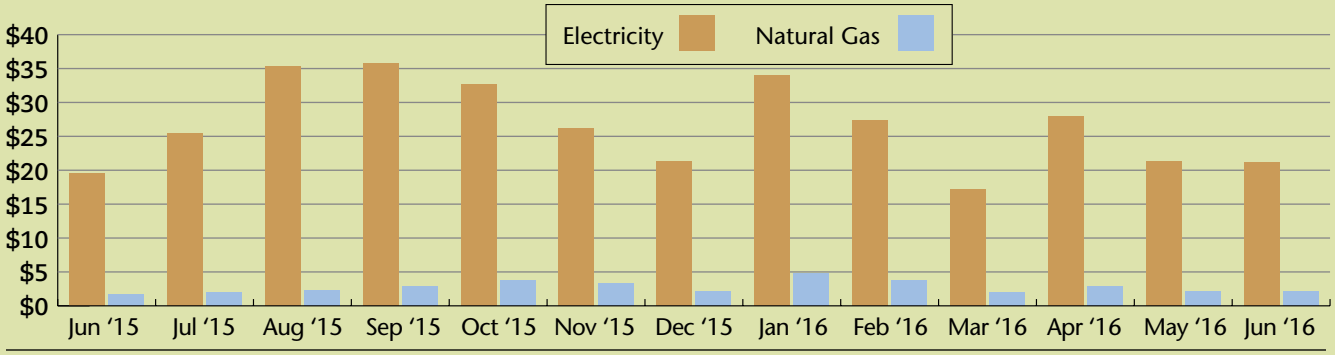
Natural gas prices, meanwhile, averaged $2.14 per million British thermal units, the sixth-lowest since 2003, but up from June 2015's record-low average price of $1.68.

Electricity prices closely track natural gas prices in New England, which is heavily reliant on gas to produce electric power. So lower gas prices mean lower electricity prices.

The other major factor is demand. In June, New England consumed 10,136 gigawatt hours of power, the second lowest amount of any June since 2000. ISO-NE said mild weather was likely the largest driver of the low demand.

A gigawatt hour can serve approximately one million homes for one hour.

New England wholesale energy prices



SOURCE: ISO NEW ENGLAND

CT colleges target utility sector

Two Connecticut colleges will launch utility-related curricula starting this month.

The most recently announced is a two-year energy-management degree at Tunxis Community College in Farmington, which will start in late August. Targeting such skills as HVAC energy analysis, energy accounting and efficient lighting, the Tunxis program is aimed at producing needed energy analysts and technicians.

Tunxis' new program followed a December announcement by Southern Connecticut State University that it would launch a utilities-management specialization within its business administration bachelor's degree program. The New Haven school's new specialty will launch in the fall semester.

SCSU said it wanted to provide a fresh pipeline of workers to the utility industry, a large portion of which will be eligible to retire by 2020.

Connecticut Water looks to grow through $21M deal

Publicly traded water provider Connecticut Water Service (CWS) has requested permission to acquire a water company that serves 4,700 customers in western New Haven County.

CWS, which has 92,000 Connecticut customers, asked the Public Utilities Regulatory Authority for permission last month to purchase The Heritage Village Water Co. (HVWC), which serves customers in Southbury, Middlebury and Oxford. HVWC also has a wastewater operation in Southbury with 3,000 customers.

The proposed deal, first announced in March, would be executed through a stock-for-stock merger valued at $20.9 million, less $4.8 million in debt CWS would assume from HVWC.

In its application to PURA, CWS explained that it has become difficult for small water companies to survive increasing costs and regulation.

CWS has acquired more than 40 water systems over the past decade and nearly 60 over the last two decades.

As of press time Aug. 1, the merger-approval process was still proceeding before PURA.

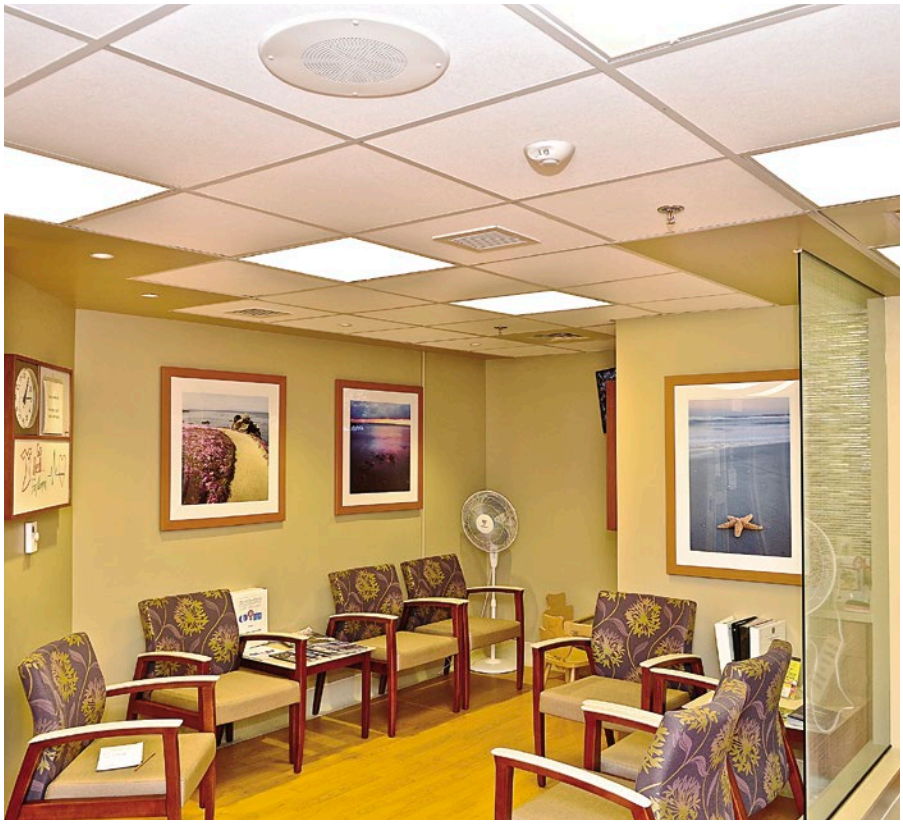
SMART BUSINESS: WEST HAVEN VA MEDICAL CENTER

Veterans' healthcare provider saves thousands with lighting upgrade

Approximately 56,000 patients are served every year in the state's Veterans Health Administration system, which has two ambulatory care centers and six primary care outpatient clinics.

Seeking to minimize wasted resources and operating costs, and to help meet conservation goals, the West Haven VA Medical Center underwent a significant upgrade this year. The ambulatory care center and inpatient facility worked with United Illuminating Co., part of Avangrid, to develop strategic plans and assess financial assistance for energy efficiency projects.

The VA Medical Center upgraded to high-efficiency interior lighting through Energize Connecticut's "Energy Conscious Blueprint" program. The program provided assistance and installation of cost-effective modern lighting systems to replace old fixtures.



Efficient lighting on display at the West Haven VA Medical Center. PHOTO | CONTRIBUTED

"The installation plan provided by Energize Connecticut was customized to our needs, making upgrades to one room at a time to accommodate our patient care areas," said Joseph Simonetta, acting chief of facilities management at the center. "By investing in energy efficiency now, we're saving money that can be put toward additional improvements in patient care, which is our top priority."

Approximately 50 high-performance T8 fluorescent light fixtures were installed in patient rooms, administration buildings, staff offices and utility rooms in the renovated women's clinic. The center received $1,667 in incentives to help pay for the energy-efficient upgrades. With the savings achieved, UI estimates it will take just over two years to break even. Over a 15-year period, the lighting improvements will save an estimated 69,900 kilowatt hours or $12,500 annually.

Energize's programs are an initiative of the Energy Efficiency Fund, the Connecticut Green Bank, state government, and local electric and gas utilities, with funding from a charge on customer energy bills.

By working through Energize Connecticut programs, energy-efficiency upgrades are more feasible for any business, allowing them to reduce operating costs and focus on their primary goals," said Donna S. Wells, director of commercial and industrial energy services at UI.

Mass. battery entrepreneur sets sights on CT

Christina Lampe-Onnerud (center) aims to grow her new Oxford battery company with the help of the team that helped her launch Boston Power in 2005, including husband Per Onnerud (rear). PHOTO | CADENZA INNOVATION

By Matt Pilon

Christina Lampe-Onnerud, an inorganic chemist and battery expert, launched a successful company in Massachusetts over a decade ago. Now she's hoping for a repeat performance in Connecticut.

She and a handful of other original founders of lithium-ion battery maker Boston-Power, including her husband, Per Onnerud, have officially launched Cadenza Innovation in Oxford.

Cadenza revealed in mid-July that it had raised $5.2 million — capital it intends to use to hire staff and further develop its battery storage offerings, among other tasks.

Connecticut's quasi-public venture capital and lending arm, Connecticut Innovations, participated in the round, which was led by New York-based Golden Seeds.

In a telephone interview last month, Lampe-Onnerud said Cadenza is targeting the electric-vehicle and electric-storage markets. The company doesn't intend to be a battery manufacturer, but aims to license its technology and architectures to battery makers and others, she said.



Cadenza is developing electric-car battery designs and architectures that offer more power density and flexibility in terms of where they can be installed in a vehicle.

PHOTO | CONTRIBUTED

Cadenza is already known to several major corporations, thanks to a federal grant its predecessor company received in 2013. Since then, Cadenza has been working with Fiat Chrysler Automobiles to test its designs. The company lists several other big partners, including Alcoa, Morgan Advanced Materials, and electric-grid builder ABB.

Cadenza says it has developed a way to pack more energy density into lithium-ion batteries. Its technology also includes novel ways to organize and house battery components, to allow for greater flexibility for auto makers.

Lampe-Onnerud said electric vehicles and batteries in general have come a long way since Boston-Power was founded in 2005, two years before Apple's release of its first generation iPhone.

"We have charging stations, we have government thinking about EV infrastructure," she said.

Massachusetts-based Boston-Power, an EV and computer battery maker that moved much of its manufacturing operation to China after securing a major investment and incentives in 2011, has raised $351 million in funding since its inception, according to CrunchBase. Venture capital data tracked CB Insights speculated late last year that the company could be on the path to a public offering.

"We were the underdogs and we basically were able to gain a small but somewhat impactful position," said Lampe-Onnerud, reflecting back on her time with the company.

Lampe-Onnerud hasn't been involved running Boston-Power for nearly four years, but she said she still holds an undisclosed ownership stake in the company.

Meanwhile, Cadenza has been in a sort-of stealth mode for the past several years.

The company registered with the Connecticut Secretary of the State's office in 2014, later canceling, then registering again in June, records show.

Lampe-Onnerud and her team didn't want to go public with Cadenza until they were confident they had good ideas.

"We wanted to convince ourselves first we had something substantial," she said. "This announcement and coming out of stealth mode are an acknowledgement that we can do some good work in the space."

Christina Lampe-Onnerud, CEO, Cadenza Innovation

She said Cadenza, which as of July had 10 employees, is on the hunt for engineers and other workers in Connecticut. There were a handful of positions open last month on the company's website, CadenzaInnovations.com

The company is also searching for a larger headquarters facility in Connecticut. It currently has space on Morse Road in Oxford.

It was no secret Lampe-Onnerud had something in the works.

Cadenza's predecessor company, Cloteam LLC (pronounced Cee-El-Oh-Team) — founded the same year Lampe-Onnerud left Boston-Power's board — received some press in 2013 when it won $3.5 million in funding from the U.S. Department of Energy Advanced Projects Agency-Energy (ARPA-E) program to develop improvements to the way lithium-ion batteries for electric vehicles are packaged — making them cheaper, more compact and energy dense, but able to withstand damage in an accident.

It was also known that Lampe-Onnerud, a known name in the Massachusetts tech community, had moved to Connecticut in 2013. She and Per Onnerud moved here after she was hired by Westport hedge fund Bridgewater Associates.

The couple lives in Wilton, where Lampe-Onnerud serves on the town energy commission. She departed her position at Bridgewater in 2014.

True Green Leadership

Why do we need programs like the GreenCircle Awards? Because the solution to Connecticut's energy and environmental challenges lies with the actions we can all take — as GreenCircle Award winners have done for years — to reduce our environmental footprint.

Since 1998 the Department of Energy and Environmental Protection has presented more than 1,100 GreenCircle awards to more than 1,600 projects that improved the quality of life in local communities. This year DEEP shifted the focus of the program to the importance of sustainability and reducing overall impacts on the environment. Thanks to our new partnership with the Hartford Business Journal and the CT Green Guide, we were able to engage and motivate a much larger audience of decision makers to nominate projects.

This partnership yielded 59 GreenCircle finalists who are working to ensure a cleaner, safer, and more attractive state for us and for future generations. These entries demonstrated to us that people are committed to taking action to protect the planet: conserving energy; reducing carbon emissions and water usage; eliminating waste through increased recycling; protecting our natural resources; and increasing public awareness of environmental issues through education and engagement.

This year's GreenCircle Awards went to four businesses, three government entities, two groups, one individual, two schools, and three universities located in Connecticut that took a coordinated, holistic approach to reduce the environmental impact and resource demands of their operations and activities during calendar year 2015. These award winners show true leadership and serve as real models.

Meet the Winners:
PGS. 10-26
Finalists:
PGS. 28-29

Congratulations to the winners, who were honored at a great awards ceremony held in May at the spectacular Infinity Music Hall in Hartford. The profiles of the awards winners in this edition of the CT Green Guide will hopefully serve as an inspiration to others.

I encourage everyone to consider entering next year's GreenCircle Awards competition. Keep an eye out for details here or in the Hartford Business Journal.

Robert Klee
Commissioner
Department of Energy and Environmental Protection

CATEGORY: Business

Comcast officials ceremoniously flipped the switch last year on the company's Berlin fuel cell.

PHOTO | CONTRIBUTED

Berlin HQ a leader in Comcast's energy efforts

In recent years, cable, telephone and Internet provider Comcast has made an increasing commitment to going green.

Early last year at its Western New England Region headquarters in Berlin, Comcast installed a 400-kilowatt Bloom Energy fuel cell plant, which was a first for the company in the United States. Today, the plant is providing 98 percent of the 80,000-square-foot facility's power load.

Since Jan. 2015, the fuel cell has generated more than 3.6 million kilowatt hours of power and reduced Comcast's carbon emissions by more than 2.2 million pounds — the equivalent of removing 200 vehicles from the road for a year.

The fuel cell isn't Comcast's only green investment in Connecticut.

The company carefully monitors its technicians' vehicles for excessive idling. That effort resulted in a carbon-dioxide reduction of more than 310,000 pounds over a six month period that began in 2015.

Comcast's New England region has also recycled nearly 2.4 million pounds of modems, cable boxes, remotes and coaxial cable since 2011, including 760,000 pounds last year.

The Berlin homebase gathers the used gear from 21 Comcast sites across the region. The company hires a specialty recycler from Western Massachusetts, Environmental Integrity Inc., to pick up and recycle the equipment.

More recently, Comcast completed a project at its Bristol data center that will optimize the use of outdoor air in the winter to cool servers.

The company has also installed motion-sensing LED interior lighting at an Enfield facility. Comcast's offices are painted with low VOC paints, while restrooms feature paper products certified by the independent nonprofit Green Seal.

Comcast

PROJECT ELEMENTS: Facility-wide; energy and climate change; material management

START DATE: Jan. 2015 and earlier

ESTIMATED COMPLETION DATE: Ongoing

CATEGORY: Business

A habitat planting event at the Pharmacia & Upjohn property in North Haven, which is nearing the end of a major remediation.

PHOTO | CONTRIBUTED

Pfizer staying the course on $143M North Haven cleanup

Pharmacia & Upjohn Company LLC/Pfizer

PROJECT ELEMENTS: Facility-wide; energy and climate change; water; material management; civic improvements; innovation

START DATE: March 2011

ESTIMATED COMPLETION DATE: June 2018

When pharmaceutical giant Pfizer purchased drugmaker Pharmacia Corp., the parent company of Pharmacia & Upjohn Co., in 2003 for $60 billion, one of the many assets it acquired was a dormant, contaminated property in North Haven near the Quinnipiac River.

Pfizer has been working with state and federal regulators since then to clean up the 78-acre site at 41 Stiles Lane, and today, the bulk of the work is complete.

The property formerly housed a chemical manufacturing plant that operated for much of the 20th century, leaving behind PCBs, volatile organic compounds, lead and other contamination.

Cleaning up a contaminated property is good for the environment, but Pfizer, the Connecticut Department of Energy and Environmental Protection, and the federal Environmental Protection Agency also sought to ensure that the approved site-wide environmental remedy, which began in 2011, was as green and sustainable as possible.

So to build a sub-surface hydraulic barrier wall to protect the river from groundwater contamination, Pfizer's contractors used repurposed slag from a blast furnace, rather than a natural resource like bentonite clay.

And instead of using emissions-emitting dump trucks to haul away sediment and soils dug up at the site, crews instead used it as sub-surface grading fill. The project also employed solar-powered air monitoring equipment.

This year, Pfizer decommissioned an in-situ thermal remediation system installed in 2015 to treat the most contaminated area of the property.

Completion of the western portion of the property is scheduled within the next three years, and there will be ongoing monitoring and maintenance of the groundwater treatment facility and the completed environmental remedy.

Pfizer intends to make a portion of the land — approximately 17 acres — available for commercial or light industrial development, while 60 acres are slated to become an ecological preserve. Plans also include interpretive trails within the ecological preserve.

CATEGORY: **Business**

Rodger and Isabelle Phillips with their children, Oliver, 8, Penelope, 11, and Remi, 16. Not pictured is Daphne, 14.

PHOTO | CONTRIBUTED

Sub Edge Farm

PROJECT ELEMENTS: Facility-wide; water; material management; civic Improvements; innovation

START DATE: Jan. 2015

COMPLETION DATE: Dec. 2015

Sustainable farming all upside for Sub Edge

Straddling the Farmington-Avon border is an approximately 300-acre farm that's been in active use since colonial names.

Rodger Phillips and his wife Isabelle Phillips, who leased farm from the two towns in 2013, are the latest generation. They've given their farm an old name, Sub Edge, which was last used by the farm around the 1920s, and they've brought a new focus on sustainable practices.

The experienced green thumbs, who have four children (ages 8-16), began farming in Connecticut around 2005. After leasing Sub Edge, the Phillips quickly put a sustainable strategy into action.

In just several years, Sub Edge received its organic certification from New York-based NOFA-NY Organic LLC, and also worked with the U.S. Department of Agriculture to craft a conservation management plan.

The plan includes strategies like cover cropping and crop rotation, which preserve and improve soil, and the use of a drip-irrigation system to limit water use and prevent erosion.

The Phillips' also created a quarter-acre pollinator habitat on the farm to help bees.

The farm also composts on site to create organic fertilizer.

Though such efforts take time, they've helped Sub Edge build a loyal following for its Community Supported Agriculture program. More than 100 shareholders visit each week to pick up the latest produce, from lettuce and heirloom tomatoes to snap peas and radishes.

With the help of four full-time employees and two seasonal workers the Phillips can grows approximately 100,00 pounds of vegetables, fruits, flowers and herbs annually.

They also have grass-fed cattle, heritage breed pigs, pasture-raised chickens and other animals. Sub Edge sells the eggs and meat at its farm store, which is open Saturdays.

CATEGORY: Business

The Serenity Garden is just one green aspect of The Orchards at Southington.

PHOTO | CONTRIBUTED

At Orchards at Southington, staff, residents pitch in

At The Orchards at Southington, a 90-unit assisted-living community owned by Hartford HealthCare, staff latched onto green ideals almost a decade ago.

The effort started modestly with decisions to purchase environmentally friendly cleaning and pest-control products and the phasing out of styrofoam dishware, but things have evolved from there.

Guided by a staff-led "green committee," The Orchards put recycling bins in its six laundry rooms for residents and its kitchen for staff. The nonprofit facility estimates it has recycled approximately 85,000 bottles and cans, as well as countless amounts of paper, plastic, cardboard and other materials. Those efforts are part of The Orchards' commitments as a participant in the Environmental Protection Agency's WasteWise program. It also follows the practices of the EPA's Food Recovery Challenge, which promotes waste reduction through composting, donating food to the hungry and other strategies.

Another green investment at The Orchards was the installation of low-flow toilets, which save more than two quarts of water with each flush, adding up to thousands of gallons saved per year. The Orchards has also reduced the amount of soap and paper towels its residents and staff consume by installing motion-sensing dispensers that dole out measured amounts.

The assisted-living community has also looked outside of its own walls, partnering several years ago with the nonprofit American Forests, which promotes forest conservation.

Under the arrangement with the "Come Grow With Us" program, The Orchards purchases a tree for every new resident and staff member. American Forests plants the trees in areas of the country that need restoration. New residents and staff then receive a certificate with their name on it. The Orchards estimates that it has purchased at least 400 trees so far.

The Orchards at Southington

PROJECT ELEMENTS: Facility-wide; energy & climate change; water; material management; innovation

START DATE: Jan. 2007

ESTIMATED COMPLETION DATE: Ongoing

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Business Gives Back

2015 cover shown

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Hartford Business Journal is pleased to bring you the 2016 edition of the **Giving Guide: Business Gives Back**.

This informative guide highlights nonprofit organizations — including the Arts & Humanities, Health & Human Services, Education, Foundations and Fundraising — that have a presence in the 61-Town Central Connecticut (Greater Hartford) region that are making a difference in our community. Nonprofits play a huge role in the region and this guide will showcase their missions, progress, governance and many initiatives.

Sample profile spread shown.

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CATEGORY: Government

Cheshire's $30 million wastewater plant is helping to improve the health of the Quinnipiac River.

PHOTO | CONTRIBUTED

Cheshire realizes benefits of wastewater-plant upgrade

Cheshire Water Polution Control Authority

PROJECT ELEMENTS: Water; innovation

START DATE: Oct. 2013

COMPLETION DATE: Dec. 2015

After a decade of planning, Cheshire officials cut the ribbon 10 months ago on a $30 million upgrade of the town's wastewater treatment plant.

One of the driving factors for the $30 million overhaul of the Cheshire Water Pollution Control Plant (WPCP) was to meet more stringent regulatory limits for phosphorous discharge to the Quinnipiac River. A new removal system at the plant has reduced both the amount of phosphorus flowing into the river each year by 21,000 pounds.

Another reason for the project was that important systems in the WPCP had exceeded their service life.

WPCP's contractors rehabbed two anaerobic digesters, which are used to break down sewage, which had been inoperable for approximately five years. Now the plant dewaters and ships as much as 40 percent less undigested raw sludge to an off-site incinerator. That saves money and lowers air emissions.

The now-fixed digesters are also providing methane gas that used to heat some of the plant's facilities, which has reduced the need to use fossil fuels such as oil or natural gas for heat.

WPCP received $205,000 in efficiency rebates from Eversource to help pay for various pumps with more efficient motors, as well as aeration systems. Those items are projected to save over 800,000 kilowatt hours of electricity per year.

A new ultraviolet disinfection system also reduced the amount of sodium hypochlorite and sodium bisulfite used at the plant by a total of 43,000 gallons per year, which is better for the environment and has saved about $30,000 in chemical costs. The two hazardous chemicals are used to disinfect sewage and remove excess chlorine from effluent before it's discharged.

Replacement of underground fuel-oil tanks with above-ground, double-walled tanks has also lowered the risk of leaks.

The plant also doubled the size of its emergency generator, which will help during power outages as well as during times of peak grid demand.

WPCP's electricity usage has also fallen thanks to automated and LED lighting and an HVAC control system.

CATEGORY: Government

Manchester's new water treatment plant has dramatically reduced chemical discharge into the nearby Hockanum River.

PHOTO | MIKE EMOND

Manchester's $51M plant overhaul means cleaner river

Like its wastewater compatriot 37 miles down the highway in Cheshire, a $51 million overhaul of Manchester's wastewater treatment plant was also spurred in part by aging equipment and stricter environmental regulations meant to protect the health of rivers that ultimately flow into the Long Island Sound.

Construction at the Hockanum River Water Pollution Control Facility (WPCF) began in 2011 and wrapped up in mid-2015.

The liquid discharged from WPCF into the river is the cleanest it has ever been. The plant, which is expected to meet Manchester's needs for the next two decades, is well below the discharge limits for nitrogen and phosphorous imposed on it by the Department of Energy and Environmental Protection.

Excess levels of nitrogen and phosphorous in marine habitats fuel the growth of algae, which ultimately reduces the amount of oxygen available for plants and fish, a condition known as hypoxia.

Manchester Sewer Department

PROJECT ELEMENTS: Facility-wide; water; material management; innovation

START DATE: DEC. 2011

COMPLETION DATE: July, 2015

The new plant removes 94 percent of the nitrogen present within the 6.5 million gallons of sewage it takes in each day. That's up from 30 percent or less pre-construction. The difference is as large as 900 pounds per day being discharged to the river.

WPCF also now removes 95 percent of phosphorous; previously it removed virtually none. The plant emits approximately four pounds of phosphorous each day, well under its regulatory cap of 13.4 pounds. It does so using a "ballasted flocculation" system, which employs clam and oyster shells as filters in a process that also breaks down odors from waste.

Like Cheshire, Manchester's plant also received incentives from Eversource to acquire more energy-efficient equipment.

CATEGORY: **Government**

Challenges the MTA faced in building its bus facility included that it was sited on an orphaned ash landfill in a floodplain.

PHOTO | CONTRIBUTED

Transit operator reclaims Middletown's orphan landfill

Middletown Transit Authority

PROJECT ELEMENTS: Facility-wide; energy & climate change; water; material management; civic improvements; innovation

START DATE: Jan. 2013

COMPLETION DATE: Jan. 2015

There aren't many potential uses for a landfill full of incinerator ash, but Middletown Area Transit (MAT) and its engineering project manager found one.

Today the orphaned landfill, located at the intersection of North Main Street and Pease Avenue, is the site of a 20,000-square-foot bus garage with office and maintenance areas and a washing station. The project cost approximately $10.5 million.

In order to reuse the brownfield site, the quasi-municipal agency and its contractors, including Hamden engineering firm DTC, had to work around a number of challenges.

Among them was the fact that the ash soils wouldn't support the construction of a building, a situation that was resolved through the use of a pile-supported foundation.

The soil required special handling. In all, contractors removed 8,280 tons of hazardous and contaminated dirt. The building and its parking lot now act as the former landfill's permanent cap.

MAT and its team also had to secure permission from the Department of Energy and Environmental Protection to reopen the landfill and from the local zoning commission to build on the site, which is located in a Connecticut River floodplain.

The garage is designed to withstand 100-year flood levels from the nearby river, with outlets and the maintenance bay built at higher elevation.

Besides finding a productive use for a brownfield, MTA also had green building systems installed in its new facility, which is heated and cooled by a geothermal well, and has ultra-low flow fixtures and efficient LED lighting.

In addition, a mechanized system recycles 95 percent of the water used to wash MAT's fleet of 20-plus buses. And the facility receives supplemental heat from a furnace that uses recycled waste oil.

Besides winning plaudits from DEEP's GreenCircle awards, the MAT project team also won an award of merit from the Connecticut Green Building Council in 2015.

CATEGORY: Individuals/Group

Medina and his pedal-powered composting rig.

PHOTO | LYNNE BONNETT

Domingo Medina

PROJECT ELEMENTS: Energy & climate change; material management; civic improvements; innovation

START DATE: Jan. 2015

COMPLETION DATE: Dec. 2015

Medina is New Haven's composter in chief

In 2014, Domingo Medina started a compost experiment that's had a positive impact both on the environment and the New Haven urban-farming nonprofit where he works.

The kicker? Medina operates solely by bicycle — collecting compost bins from fee-paying area residents. Medina dumps the contents of the buckets into larger bins on a trailer he pulls by bike. Medina, compost director for New Haven Farms and its Peels & Wheels program, even built a solar-powered blower to aerate the compost.

He recruited city government to donate wood chips that are used in the composting process, while Yale and landscapers have donated leaves.

By the end of last year, Peels & Wheels had converted 13 tons of food scraps and other usable waste into nutrient-rich compost.

That compost went to Phoenix Press Farm, which is one of nine plots New Haven Farms operates in partnership with various community partners, such as commercial printer Phoenix Press — the site of Connecticut's first major wind turbine in 2010. The 100-kilowatt turbine towers over the vegetable plot below.

Without Medina's efforts, New Haven Farms would have to produce its own compost or purchase it. Compost can cost $20 or $30 per cubic yard, or even more, depending on quality, amount and other factors.

Besides benefitting a local nonprofit that promotes healthier living for urban residents, Medina's composting operation also helps the environment. When landfilled, food waste is a major source of the potent greenhouse gas methane. It also produces greenhouse gases when incinerated (which costs money).

Medina, who has spoken at area schools and other events about composting, hopes to scale up the composting operation.

CATEGORY: Individuals/Group

Disposable water bottles are a no-no at the Eversource Hartford Marathon, so runners receive these reuseable bottles instead.

PHOTO | CONTRIBUTED

Hartford Marathon steps up its green game

For years, organizers of the Hartford Marathon have made a point of reducing the use of bottled water waste generated at the race.

But with the sign-on of new title sponsor Eversource two years ago, environmental friendliness took on a more central role. The race now uses solar panels to help power event operations. The Hartford Marathon Foundation last year purchased carbon credits offsetting more than 70 metric tons of emissions. Such credits are purchased from carbon-emitters who are under their permitted emissions caps.

Race organizers are still focused on reducing bottled water consumption and waste. Last year's race used 7,450 gallons of water from local taps, instead of bottles. Organizers also distributed reusable bottles, and the finish line features a custom 40-foot-long drinking fountain for thirsty runners.

Hartford Marathon

PROJECT ELEMENTS: Energy & climate change; water; material management; civic improvements; innovation

START DATE: Jan. 2015

COMPLETION DATE: Dec. 2015

The foundation also gathered 1,300 pounds of old and obsolete signage and other material to be "up-cycled" into bags and garbage receptacles. In total, the race diverted approximately 18 tons of event-related waste from going to a landfill, including food and clothing organizers donated to charity.

Organizers also partnered with eco clubs at UConn, which managed composting during the October weekend race.

CATEGORY: Individuals/Group

The heart of the Stamford 2030 District, where major property owners work together to reduce resource consumption.

PHOTO | CONTRIBUTED

Stamford's property owners take the lead on efficiency

Stamford 2030

PROJECT ELEMENTS: Energy & climate change

START DATE: Jan. 2015

COMPLETION DATE: Dec. 2015

In Stamford, major property owners and managers have banded together in an effort to reduce their collective energy and water consumption.

Stamford 2030, founded in Oct. 2014, is one of 13 such public-private partnerships across North America. The districts aim to reduce energy and water use by 50 percent in existing buildings by 2030. For new construction, the goal is stricter — immediate reductions of 50 percent for water usage and transportation emissions and an eventual 100 percent energy use reduction by 2030.

Stamford's district contains 12.9 million square feet of member properties, including commercial and multi-family structures.

The district has some big-name members, including Starwood Hotels and Resorts, the Ashforth Co., Fairfield University, Purdue Pharma and others. Besides reducing their energy costs and improving the environment, members also receive certain exclusive discounts and incentives.

In 2015, owners and managers of 18 Stamford properties began benchmarking their utility usage using WegoWise software. In addition, 22 owners and managers took a three-day Green Professional Building Skills Training certificate course in New York, hosted by the Urban Green Council.

Last year, 23 percent of participating properties determined that their energy performance was nearly 24 percent better than the national median. The goal in the next 14 years is to reach 100 percent and 50 percent, respectively.

As a city with its southern border on the Long Island Sound, Stamford's 2030 District has also begun planning for flooding resiliency.

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CATEGORY: Schools

Students at Prince Tech in Hartford work on an "e-house."

PHOTO | CONTRIBUTED

CT tech schools churn out green-trade pros

Across the 17-school Connecticut Technical High School System (CTHSS), students learn about energy-efficient building technology in a decidedly hands-on manner.

In 2011, with funding and support from the Connecticut Green Bank and the Clean Energy & Investment Finance Authority, CTHSS faculty launched a new curriculum centered around the building of miniature homes containing state-of-the-art, efficient systems for heating, cooling, water and lighting.

Since then, students have constructed nine of the so-called e-houses, and there are six more in the works.

They act as laboratories for students learning carpentry and masonry, as well installation skills for solar panels, geothermal systems, radiant floor heating, HVAC systems and other infrastructure.

CTHSS produces an estimated 70 percent of building-trades apprentices in Connecticut.

The e-houses have grown in size over time, from initial footprints of 320 square feet to more recent footprints of 800 square feet. One e-house has two stories, with residential systems on one floor and commercial systems on the other.

School districts outside Connecticut have taken an interest in the unique program. School officials from Chicago contacted CTHSS to learn more.

E-houses aren't the only energy-efficient part of the CTHSS curriculum.

Students also performed planning and installation work on an LED lighting retrofit at four schools in Hartford, New Britain, Manchester and Danbury.

The utility-administered Small Business Energy Advantage Program financed the project, which is expected to save more than $126,000 a year, with an overall payback period of less than four years.

CT Technical High School System

PROJECT ELEMENTS: Facility-wide; energy & climate change; innovation

START DATE: Mar. 2014

ESTIMATED COMPLETION DATE: Nov. 2015/ongoing

CATEGORY: Schools

This lighting retrofit is one of many green elements New Haven has incorporated in its school-building program over the last several decades.

PHOTO | CONTRIBUTED

New Haven thinks ahead on school construction program

New Haven Board of Education/ AFB Management

PROJECT ELEMENTS: Facility-wide; energy & climate change; material management; innovation

START DATE: Jan. 2015

ESTIMATED COMPLETION DATE: Ongoing

Starting in the mid-1990s, New Haven launched a massive school construction campaign that today has led to the replacement of more than 40 buildings.

The $1.6 billion-plus effort, coordinated by the New Haven Board of Education and its facilities management contractor AFB, has led to the installation of plenty of green and energy-efficient features in the new buildings, including a 400-kilowatt fuel cell that powers two elementary schools, a cogeneration plant that provides hot water to six facilities, solar panels on six buildings (with plans to add many more), and more efficient equipment like boilers and LED lighting.

The district-wide effort is known as the Operations Stewardship & Efficiency Program, and it helped win New Haven and other needy districts additional state funding to maintain their infrastructure.

The program's goal is to squeeze as much value as possible from taxpayer-backed school construction funding by ensuring replacement and upkeep of energy-efficient infrastructure and equipment as the need arises.

In 2015, the program saved approximately $4.9 million across the New Haven school district, bringing total savings since the plan was put in motion seven years ago to approximately $22 million.

Reflecting New Haven's green school goals, the city's school construction committee has since added "stewardship" to its official name.

Two new schools are slated to be completed this fall, with several more in the pipeline. Of the new schools built so far, five have achieved an Energy Star rating.

CATEGORY: Universities

ECSU President Elsa Nunez talking at a kickoff meeting for SolarizeU, which encouraged employees to put solar panels on their homes.

PHOTO | CONTRIBUTED

ECSU promotes clean tech, firms up waste collection

Eastern Connecticut State University

PROJECT ELEMENTS: Facility-wide; energy & climate change; material management

START DATE: Jan. 2015

COMPLETION DATE: Dec. 2015

Eastern Connecticut State University spent 2015 urging employees and students alike to be more green.

The efforts of Windham-based ECSU's Green Campus Committee included encouraging employees to install solar panels on their homes, a showcase event for electric vehicles and the installation of two public charging stations, and increasing recycling of discarded items during dorm move-outs.

ECSU worked with the Connecticut Green Bank to promote the SolarizeU program. More than 40 employees received price quotes to install solar panels on their homes. Six followed through.

The university also performed regular audits of discarded dormitory items, analyzing how it might reduce the number of full dumpsters contributing to the waste stream. The effort led to the collection of 1,256 items with a total value of nearly $4,200, which the school donated to local charities. It also saved approximately $30,000 by enabling less frequent dumpster pickups.

Another way ECSU promoted environmental ideals in 2015 was its second annual campus sustainability conference, which drew more than 130 attendees in April. Six months later, the school hosted a campus sustainability week, with events featuring green yoga and community gardens.

In November, ECSU's president signed the White House's American Campuses Act on Climate Pledge, which recommitted the school to achieving carbon neutrality by 2050.

CATEGORY: Universities

SCSU interns run "Compost Happens," which supports a community garden that donates to local soup kitchens.

PHOTO | CONTRIBUTED

Interns boost SCSU's environmental efforts

Southern Connecticut State University first pledged to pursue carbon neutrality in 2007, and many efforts have gone towards that goal since.

Last year, the New Haven School opened its new Academic and Laboratory Science Building, which SCSU hopes can attain LEED Gold certification. The building features a 40,000-gallon underground cistern that collects rooftop rainwater, allowing it to be used for irrigation, which lowers water use.

Throughout 2015, the university worked with Ameresco to analyze energy behavior in the largest classroom building on campus, Engleman Hall, which helped optimize building-system settings and is on track to save approximately $90,000 per year.

In addition to those efforts, SCSU's Office of Sustainability grew its internship program last year from just a handful of students to 11.

The interns have helped update the school's climate action plan and complete a feasibility study with United Illuminating and Celtic Energy studying a one-megawatt solar array.

They also help man and track inventory at SCSU's office supplies "swap shop," from which various departments give and take supplies when extra are available. The shop has saved $70,000 since 2013.

One intern worked with SCSU's food services provider, Chartwell, to collect unused food to donate to a local food bank. Another completed a semester-long audit aimed at optimizing on-campus waste collection schedules — an effort expected to save as much as $20,000 per year.

Interns also manage the school's 2,800-square-foot community garden, which donated almost 200 pounds of fresh produce to soup kitchens last year. The garden benefits from an intern-supported composting program.

Finally, two interns cleared invasive species and helped maintain an urban oasis site near Beaver Pond that's a pollinator and bird habitat.

Southern Connecticut State University

PROJECT ELEMENTS: Facility-wide; energy & climate change; water; material management; civic improvements; innovation

START DATE: Jan. 2015

COMPLETION DATE: Dec. 2015

CATEGORY: Universities

UConn student volunteers promote recycling at a UConn basketball "green game day."

PHOTO | CONTRIBUTED

UConn builds, acts green

University of Connecticut

PROJECT ELEMENTS: Facility-wide; energy & climate change; water; material management; innovation

START DATE: Jan. 2015

COMPLETION DATE: Dec. 2015

At the state's flagship university, 2015 was a pretty green year.

To start, UConn attained LEED Silver certifications for three major construction projects and kicked off a five-year LED replacement program that's already saved over $73,000.

Among the projects that attained LEED Silver were the Werth Family UConn Basketball Champions Center — a $40 million practice facility adjacent to Gampel Pavilion; the Wilfred B. Young Building, which houses classrooms and offices in the College of Agriculture, Health and Natural Resources; and the Bousfield Psychology Building.

UConn has 23 LEED-certified facilities at its main campus in Storrs, encompassing more than 2 million square feet.

The school also installed low-flow water fixtures and aerators in all student residence halls and apartments — a part of its commitment to achieve net zero energy and water growth that's saved as much as 100,000 gallons of water per day.

The relamping program has already tackled 31 buildings. Among them is Gampel Pavilion, which held its first LED-powered event in 2015. The new lighting system allows for strobe effects, color changes and other effects not previously possible at the arena.

In addition to its green construction efforts, in 2015, UConn also launched a bicycle-sharing program and the Green Campus Academic Network (GCAN), which has built on-campus demonstration projects like rain gardens and air-monitoring stations.

The creation of GCAN ultimately led to a trip for a dozen students and six faculty and staff to the United Nations' 21st annual climate change conference in Paris late last year, where participating countries set the most ambitious greenhouse gas reduction goals in history.

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Finalists

All American Waste LLC, Enfield, CT, for their natural gas fleet conversion.

All Waste Inc., Hartford, CT, for their reduction of harmful emissions being emitted into the atmosphere by the use of diesel fuel.

BD Medical Systems, Canaan, CT, for their air compressor system upgrade.

BJ's Wholesale Club, Westborough, MA, for their Ash Creek tidal buffer zone enhancement.

Boehringer Ingelheim Pharmaceuticals Inc., Ridgefield, CT, for their water storage tank refurbishment project.

Brewer Pilots Point Marina, Westbrook, CT, for their solar powered pumpout vessels.

Brookfield YMCA Comprehensive Energy Efficiency and Resilience Upgrades, Brookfield, CT, for their comprehensive energy retrofit project.

CED Greentech East, Enfield, CT, for building synergy between their polar PV customers and energy efficient lighting retrofit customers to facilitate a one-stop shop.

Chapman Manufacturing Company, Durham, CT, for their efforts on composting waste.

Christopher Kueffner, Partner, The Adventure Park at Storrs, Storrs, CT, for forest stewardship and resource management.

City of Hartford Planning and Zoning Commission, Sara Bronin, Chair, Hartford, CT, for their comprehensive sustainability-focused revision of the Hartford zoning code.

Clean Energy and Sustainability Task Force, Durham, CT, for their Durham Fair compost project.

Comcast Cable, Berlin, CT, for their energy management and recycling efforts.

Connecticut Farm Energy Program — Connecticut Resource Conservation and Development Area Inc., Haddam, CT, for their farm energy projects.

Connecticut Green LEAF Schools, Hartford, CT, for improving school environmental programs and actions.

Connecticut Technical High School System, Middletown, CT, for their innovation and systems approach to sustainable energy management.

Coventry Energy Conservation Alternative Energy Advisory Committee, Coventry, CT, for promoting energy conservation in Coventry, Connecticut

Connecticut Department of Correction, Wethersfield, CT, for various energy and water conservation projects.

CTfastrak, Connecticut's first bus rapid transit system, West Hartford, CT, for their role in energy conservation, pollution prevention and recycling-related activities.

DaCruz Manufactuing Inc. (formerly C&M Screw Machine Products Inc.), Bristol, CT, for their implementation of clean energy generation project utilizing solar power.

Domingo Medina, New Haven, CT, for his building of a compost community.

Eastern Connecticut State University: Green Campus Committee, Willimantic, CT, for comprehensive sustainability initiatives.

Eco-Smart Inc., West Haven, CT, for offering energy and finance consulting services, providing energy efficient building products and green bank financing options to the construction industry.

ESPN Inc., Bristol, CT, for their campus energy efficiency projects.

Ginger Chapman/Yale Office of Sustainability, New Haven, CT, for Yale University's 11th annual Spring Salvage.

Goodwin College, East Hartford, CT, for their stormwater harvesting.

Greenwich Academy, Greenwich, CT for their whole campus sustainability initiative.

Hartford Marathon Foundation, Glastonbury, CT, for the green efficiencies Eversource Hartford Marathon.

Joel M. Rinebold, Director of Energy Initiative at Connecticut Center for Advanced Technology Inc. (CCAT), East Hartford, CT, for the Connecticut hydorogen and fuel cell development plan.

The Joyce D. and Andrew J. Mandell Greater Hartford Jewish Community Center Inc., West Hartford, CT, for their energy conservation/air conditioning management.

Kate Donnelly, Chair, Hampton Green Energy Committee, Hampton, CT, for the Hampton Elementary School 127kW solar installation.

The King Low Heywood Thomas, Stamford, CT, for their development of a one-three-five year sustainability plan.

Leticia Colon de Mejias and the Green Eco Warriors, Windsor, CT, for Save Energy, Save Dinero — Creating a culture of sustainable thinkers.

Materials Innovation and Recycling Authority, Rocky Hill, CT, for their landfill redevelopment project.

Meriden Enterprise Center, c/o 290 Pratt Street LLC, Meriden, CT, for their brownfield site remediation and comprehensive energy efficiency upgrade.

Middletown Area Transit Bus Maintenance and Storage Facility, Hamden, CT, for their efforts in energy savings, recycling of waste oil and flood protection.

New Haven Board of Education/AFB Management, Bridgeport, CT, for their operations stewardship and efficiency plan.

O&G Industries Inc., Torrington, CT, for their collaboration with Flander's Nature Center.

Oak Grove Montessori School, Mansfield Center, CT, for their Yolk Grove: the many lives of an egg.

Pharmacia and Upjohn Company LLC, North Haven, CT, for their RCRA Corrective Measures Implementation Program.

Pitney Bowes, Shelton, CT, for their environmental stewardship efforts.

Pratt & Whitney, Middletown, CT, for their employees demonstrating commitment to the environment with Source to Sea river cleanup.

Saybrook Point Inn and Marina, LLC, Saybrook, CT, for their sustainable growth and increase in public waterway access.

Southern Connecticut State University, New Haven, CT, for their program SCSU Sustainability in 2015: Interns Help Lead!

Stamford 2030 District, Stamford, CT, for their 2015 Energy Reduction Target.

Sub Edge Farm, Farmington, CT, for their sustainable agriculture practices.

The Hartford, Hartford, CT, for their program "Connecticut On the Move."

The Orchards at Southington, Southington, CT, for their sustainable green program: Reduce, Reuse, Recycle and Recover.

Town of Cheshire Water Pollution Control Department, Cheshire, CT, for their control plant upgrade.

Town of Manchester Sewer Department, Manchester, CT, for the Hockanum River water pollution control facility upgrade.

Town of Old Saybrook, Old Saybrook, CT, for their "Open Space Goal."

United Technologies Corp., Farmington, CT, for their program, Food Foolish: The hidden connection between food, waste, hunger and climate change.

University of Connecticut, Storrs, CT, for their campus of sustainability.

University of Connecticut/Department of Natural Resources and the Environment, Storrs, CT, for their training environmental professionals.

USA Hauling and Recycling, Enfield, CT, for their natural gas fleet conversion.

Valley Container Inc., Bridgeport, CT, for their integration of eco-friendly inks.

Wilton Go Green Inc., Wilton, CT, for their No-Idle Campaign.

Windsor Marketing Group, Suffield, CT, for their facility expansion and upgrade.

PHOTO | CONTRIBUTED

New Milford Hospital's key motivations for installing a green roof on its new emergency department were aesthetics for the surrounding neighborhood and reducing cooling costs in the summer.

HEADQUARTERS: New Milford

EXECUTIVE DIRECTOR: Dr. Thomas Koobatian

FOUNDED: 1921

EMPLOYEES: 220

WEBSITE: www.newmilfordhospital.org

Did you know?

One of the challenges of green roofs is that they require sturdier construction to support the weight of plants and soil. According to Maryland's Conservation Technology, green roofs must be able to support as much as 100 pounds more per square foot than a normal roof.

A roof of changing colors

When New Milford Hospital built its new emergency department last year, designers were particularly sensitive to how the roof would look from surrounding residential streets at higher elevations.

A big black rubber rectangle wouldn't provide the aesthetic desired by the Western Connecticut Health Network-owned hospital. So instead, New Milford decided to install a 6,000-square-foot green roof covered with flowering plants called sedum.

The black rubber is still there, but hidden underneath the plantings, which change colors in different seasons — green in the summer, yellow in the spring and reddish brown in the fall.

Besides creating a prettier view for neighbors, the $180,000 roof's other major benefit is it reduces cooling costs in the new emergency department because the roof surface doesn't get as hot during the day.

The plantings also reduce rainwater runoff and the nitrogen it brings to area waterways, and in the end are expected to extend the life of the roof to 40 years or more, because they block the sun's ultraviolet radiation.

New Milford hasn't done an exact cost-benefit analysis for the roof, and it has no baseline energy consumption to make comparisons, since the emergency department is new. But Charlie Geyer, site director, estimates that the roof will pay for itself in 12 to 15 years.

The green roof was supplied by Maryland's Conservation Technology and installed by Danbury's Barrett Inc.

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